NETWORK

Networking Management For Information Systems Professionals September 9, 1988

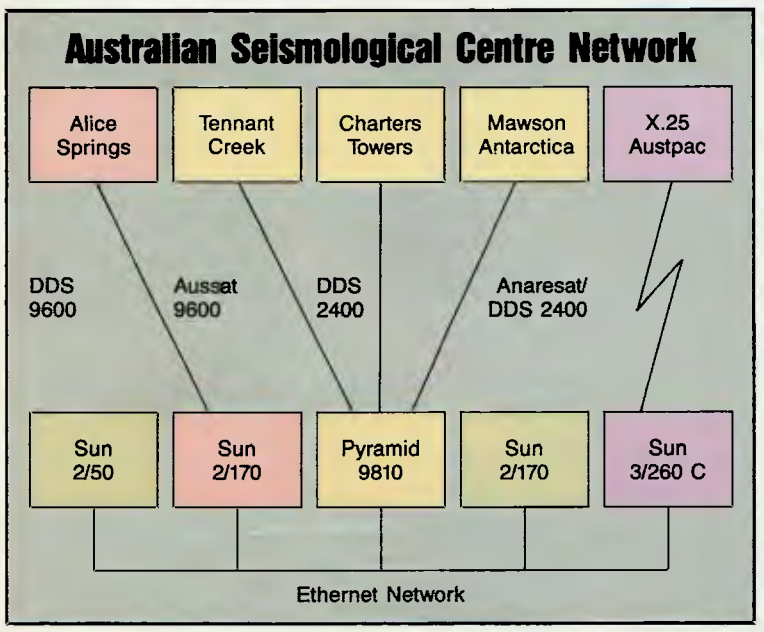
Comms monitor the earth

How Australia keeps an ear to the ground

CANBERRA — The Australian Seismological Centre (ASC) in Canberra is using an advanced communications system connecting seismometers to a Pyramid computer and Sun workstations to guage the effects of underground nuclear tests and earthquakes around the world.

Monitoring is carried out seven days a week by 20 seismomometers buried to a depth of 30m and spread over an 80 sq km area near Alice Springs.

Data from the seismometers is collected at a rate of 20 samples a second on each channel and automatically transmitted along a 25-channel DDS line to Canberra to a network of Sun 2/170s and 2/50s.



How the Seismological Centre's network works

Pyramid Technology Australia's federal region manager Ray Edwards said analysts examined the data on one of the Sun workstations before storing it on disk on an eight Mips (million instructions per second) Pyramid 9810 connected to the Suns via a thin Ethernet network.

He said the data from the Pyramid was then transferred to magnetic tape and archived indefinitely for use by seismologists in Australia and overseas.

The data allows seismologists to compare the size, frequency and intensity of earthquakes and underground nuclear tests.

It is also being used by the Group of Scientific Experts (GSE), part of the United Nations' Conference on Disarmament with which the ASC is working, to calculate the technical problems involved in a Comprehensive Test Ban Treaty (CTBT) that would permanently ban all nuclear tests.

The ASC's computer systems manager Kim Malafant said the system depended on rapid transmission of information from various sites to determine the location of an event and whether it was a nuclear explosion or an earthquake.

"Most countries do not have the space to have more than one or two sites in an array because of the constraint of minimising the effects of cultural noise on the array.

"Australia is lucky in that we have two sites, one at Alice Springs and the other at Tennant Creek, where we have recently installed a system to telemeter data down to us. This increases the level of information available to us."

Australia also has a number of high-gain, single-seismometer sites at Charters Towers in Queensland and Mawson in the Antarctic where data is collected and transmitted in digital form to the ASC in Canberra.

Information from a number of other sites is also transmitted to the ASC but is stored as analogue records on paper charts, which will continue until a digital system is completed later this year.

Malafant said that when the work was finished, the ASC would increase its daily data collection rate from 180M-bytes to between 0.5 gigabytes and 1 gigabyte a day.

Ray Edwards . . . data archived

"The idea is to use the Pyramid as a large disk farm to store 10 days of data on disks, allowing quick and ready access to information for urgent verification of an event," he said.

He said older data, often required for research purposes up to years after the event, would be easily retrieved from the ASC's magnetic tapes.

As well as the information collect-

(Continued page 3)

Net saves host cost

SYDNEY — Joining the company's global network has saved Jardine Fleming Australia (JFA), a wholly owned subsidiary of Hong Kong merchant bank Jardine Fleming Holdings, the cost of a mainframe host computer.

Even though JFA spent more than $A2 million on hardware before being incorporated into the network, which already linked the company's London, New York and Hong Kong operations, the manager of information systems Ambrose Ngu said it was a better alternative.

He said the network was used to transport information and messages to offices around the world.

"If we want to use a computer system which is not in Australia, we use a terminal to access the relevant host. This saves us the cost of a mainframe/host and also enables us to access world wide information, which is invaluable to the Australian market," Ngu said.

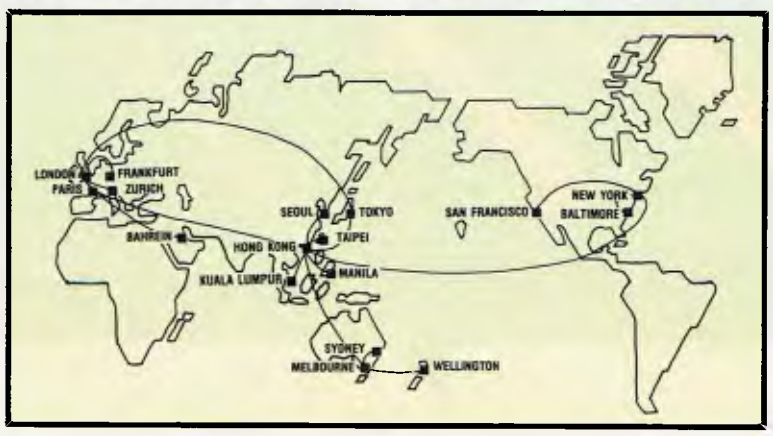
"The main advantage of this system is that when the stock markets close in Australia, we compile an analysis of the market situation and send this to our other offices. This is particularly useful for those cities whose markets are about to open.

"We have expanded our core activities and the network is allowing us to enhance our business opportunities in Australia."

The network is based on a Case Communication Systems' Beeline Message Switching and DCX Multiplexing Network. Telecom and OTC services proved to be inadequate for JFA, so the Beeline system now handles all of its message switching and telexes.

The Australian operation has access to centralised computing software running on a mainframe computer in the company's Hong Kong site, which also has two Wang and two IBM minicomputers.

(Continued page 3)



Joining this global network saved the expense of buying a mainframe host.

Bank goes for a satellite solution

SYDNEY — After a 12-month trial of Aussat's Starnet satellite-based private data communications network, the Commonwealth Bank plans to use the technology for data transmission from branches and staff training.

The bank's senior manager for DP, Mike Farrell, refused to disclose how much the bank had invested, even in approximate figures, to use satellite technology, but said it was the first major financial institution in Australia to use it for extensive data transmission.

He said the bank's use of the technology would evolve. At the moment it was still very much in the "pilot stage", but it would progress to 100 branches around Australia.

Arrangements have been completed to expand the pilot network, including three NSW branches and one Darwin branch, to 14 branches — five in NSW, two in Queensland, and one in the Northern Territory, Western Australia and Victoria.

The service offers the bank reliable communications for remote branches, an alternative to establishing more land lines in high traffic areas, and one-way video distribution — the platform for staff training.

The bank's chief retail general manager, Len Spencer, said Starnet's flexibility was a key attraction of the technology.

The bank's Starnet service will use NEC-supplied Very Small Aperture Terminals (Vsats) with 1.8 metre dishes running at an interactive speed of 9600 bit/sec.

It will use IBM's SNA/SLDC computer protocol, although Starnet supports X.25. Its 9600 line speed can be varied to 1200 bit/sec for each location through a simple command from the Aussat teleport.

Starnet requires a hub facility (hardware and software) at a major Aussat office and connected to a customer's head office and a small Vsat at each remote location.

Satellite technology is helping a private rescue organisation to respond quickly to emergencies all over Australia ..... Page 5

Arcnet forecast to remain a market force for years yet because it is 'cheap, reliable and well documented' .....Page 7

Lans began the PC explosion, says Jeff Malley, who traces their development in the first part of a two-part article ..... Page 9

After several years, digital PABX systems are coming into their own for data traffic, writes Ben Braeuer ..... Page 11

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Catering for the pollies' palace

CANBERRA — Ensuring there is food for our politicians' bellies is one of the unlikely functions of a network, worth more than $A200,000, installed at Australia's new Parliament House.

Catering at the nation's greatest government building is so extensive that the Parliamentry Information Systems Office and the Joint House Department gave Vital Technology Australia a contract to supply and instal a computer-based integrated catering system.

A comprehensive food and beverage service, on a commercial basis, is offered for senators, members of parliament, their guests and staff, employees of parliamentary departments, and other people working in Parliament House.

The provisional Parliament House served more than 100,000 meals in 12 months. It is envisaged that with increased demands for function catering, room service and the public cafeteria, this will increase to about 400,000 meals in the new building.

Information processing for such a tall gastronomic order will be done initially with 25 Vital Series 3000 intelligent point of sale (POS) terminals, 13 workstations, and 12 printers connected to an Altos 386 Series 2000 central processing unit. The system will run Vital's Hims hospitality system.

The network will be based on a broadband/baseband Ethernet system using various communications devices such as transceivers, Decservers, and multiplexers.

It spans four levels in Parliament House and is the result of a team comprising people from the Parliamentary Information Systems Office, Vital and Altos Australia.

Sales Information from the POS terminals will be collected at each workstation. The Altos machine will process the data and generate daily management reports detailing food and beverage consumption.

The system, through an interface to the Parliamentary Catering Service's computer-based accounting system, will also control acquisition, storage and distribution of supplies to selling outlets throughout Parliament House.

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IDG COMMUNICATIONS

Earth monitor

(Continued from page 1)

ed in Australia the ASC was able to request data from overseas organisations such as those at Grafenberg in the Federal Republic of Germany and in Norway.

Malafant said the GSE planned to test an international seismic data exchange system in 1990.

A component of this test will be the testing of the communications facilities at authorised government national data centres such as the ASC.

Malafant said it would show how quickly data from NDCs was able to be transmitted to four International Data Centres (IDCs), responsible for collecting and analysing the data.

He said the four IDCs would act as collection points for data from the NDCs in Stockholm, Washington, Moscow and the ASC.

"For the test in 1990 and any subsequent CTBT coming into effect, the ASC will need to upgrade its computer facilities to cope with the additional data flow," Malafant said.

Host cost saved

(Continued from page 1)

JFA uses two HP-3000s, which are installed off site in Melbourne and Sydney and managed by a third party. One uses a Case DCX 860 multiplexer and the other a Case DCX 825 multiplexer.

The network uses two other main multiplexers: a DCX850 in Melbourne and a DCX 860 in the Sydney head office. To give some idea of the network's complexity, the DCX 860 is based on a Multiple 68000 architecture.

It combines multiplexing, data concentration and switching, port contention, X.25 gateways, protocol conversion and management. The Beeline system is a store and forward message handling system that provides connection to public networks and host computer systems.

Ngu said the system was essential because today's highly competitive financial environment demanded fast, efficient and assured transmission of information.

"Information must be exchanged rapidly between offices," he said.

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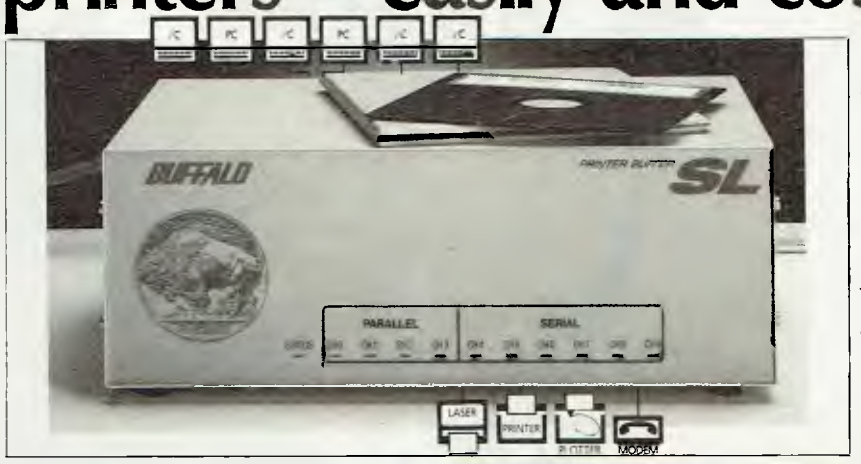

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A B C D E F G H I J K L M

Nuclear body sells fast data link

By DAVID HUTCHINS

SYDNEY — The Australian Nuclear Science and Technology Organisation (Ansto) has developed a product which allows asynchronous devices, including PCs, and Ethernet neworks to be connected to IBM mainframes and to have channel speeds of up to 3M-byte/sec.

It is expected the hardware and software solution will have an average price of $A50,000 and be targeted at universities, government departments and large organisations.

Ansto's computer centre director, Dr Don Richardson, said the product allowed fast and efficient connection of asynchronous devices to the main input channel in mainframes such as the Ansto IBM 4381Gp 3, which has 16M-bytes of main memory and 15 gigabytes of disk storage.

Terminal-host communications within Ansto have already been rated at 9600 bits/sec within the 10M-byte limitation of the Ethernet procotol of a recently installed Network Solutions fibre-optic-based network, which has a DEC PDP11 communications server frontend.

Richardson said the product gave terminal users mainframe power.

"This system allows access to all the features of a mainframe computer applied in a tehnical or scientific environment," he said. With today's demand for connectivity, it is increasingly important for desktop terminals to be able to access the vast information stores of onsite mainframes, a problem exacerbated within the multivendor computing environment that is the emerging standard of the 1990s and beyond.

"In the past the cost of this connectivity alone could be prohibitive. For universities and large organisations such as our own, the cost savings of our systems will provide a very welcome bonus to the efficiencies gained in operations.

"As an example, a single sychronous terminal costs about $A2000, compared with around $A500 for an asynchronous terminal. To configure an ordinary PC for synchronous communications costs at least $A1000 over the price of the base unit."

Richardson said the $A350,000 fibre optic network, which went live almost 12 months ago, was "leading edge" and had allowed Ansto scientists to rebundle their long established inhouse technology for the world markets.

Seventy more

Ansto has connected about 160 terminals as well as users from seven Commonwealth Science, Industry and Research Organisations (Csiro) divisions to the network. Seventy more devices are expected to be added within a year.

Network Solutions' general manager, Richard Fremantle, said Ansto was now a giant Ethernet network.

He explained: "The main backbone of the network is fibre optic Ethernet, with coaxial segments throughout the building and 18 Bridge CS/200 TCP/IP terminal servers providing the connection for 160 users, with 70 additional devices planned for next year."

Terminals are connected to the CS200 servers via RS/232 cabling. PC networks will be connected via thin Ethernet coaxial cable and multiport repeaters for integration of subsidiary networks.

Project manager for installation of the network at Ansto, Dr Glynn Peady, said PCs were eventually expected to make up most of the connected devices on the network.

In the meantime the network was expected to expand and Ansto's IBM System 38 would be connected soon so that budgeting and accounting information would be available throughout the site.

Fibre optic bridges link incompatibles

SYDNEY — Integral Fibre Systems (IFS) claims the Fibronics System Finex, which it distributes, uses a series of fibre-optic bridges to enable networking of disparate devices and local area networks (Lans).

The Fibronic System Finex is a dual fibre, high-bandwidth 100-BMPS, counter rotating token ring system that can connect heterogeneous networks.

IFS's general manager Gordon Jalkemo said with System Finex, networks of up to 500 stations and 100km of duplex fibre cable, along with 100nm LED-based technology, were possible.

"Theoretically any previously heterogeneous hardware can be connected to any other system."

He said the capability was expected to be popular, particularly in companies that may have been merged or been taken over by a company with incompatible computer hardware.

Stations on the network can be up to 2km apart because optical fibres ensured no bottlenecks occurred during internetworking while a token ring architecture was employed, Jalkemo said. The network would also continue operating in the case of node or media failure because of an automatic reconfiguration facility.

Figate 1, of the System Finex range, is a self-contained learning bridge IEEE 802.3 Lan. Jalkemo said that combined with the FDDI backbone, it enabled separate IEEE 802.3 Lans to appear as if they were self contained.

It also allows DEC Vax or IBM hosts to be connected to the extended Lan via its Ethernet ports. According to Jalkemo, Figate 1 will not cause any degradation of the other Lans or cause their error rate to increase.

Figate 1 comprises the Basic Finex Controller (BFC), the Device Interface Unit (DIU) and software containing the learning bridge software, and a Motorola MVME330 Lan controller card.

Message-handling

SYDNEY — Local area network vendor Novell Inc has added message-handling service (MHS) capability to its NetWare product, and 13 software developers have started incorporating the message-and-store technology into their programs.

MHS, a set of application programming interfaces, is part of the applications layer of the OSI protocol stack. By offering MHS for NetWare, users will be able to add communications capabilities to their applications.

The program will allow users of dissimilar applications to send messages, documents and reports from one program to another.

NSCA's Victorian division projections

Satellite helps rescue hook-up

By DAVID HUTCHINS

THE National Safety Council of Australia (NSCA) depends on satellite links to ensure it can communicate to its bases throughout the country and respond quickly to an emergency regardless of the location.

The NSCA, a private rescue organisation that offers its facilities on a fee-for-service basis to statutory emergency organisations, also uses a Telecom 9600 bit/sec land line to communicate with its Melbourne office.

It uses satellite links to Townsville in Qld and Illawarra in NSW, a Telecom 9600 bit/sec land line to its Melbourne office and has plans to link all of its other bases with satellite dishes by the end of the year.

Effective communications and computing have an essential role in the NSCA's operations, which extend around the Pacific basin. The NSCA's headquarters, in the Victorian country town of Sale, must be able to communicate with its bases and remote locations to monitor and manage a rescue or surveillance operation, such as mapping a bushfire.

Computer facilities at the NSCA comprise: a DEC Vax 8350 and a Vax 780; a Micro Vax II; a GPX workstation; and an Ibas imaging processing system based on a Motorola 86000/600 processor.

It also has IBM-compatible PCs and Toshiba laptop computers. It has about six gigabytes of disk capacity.

The company uses the Oracle database system and an inhouse resource scheduling system, which took six months to develop and may be offered to similar rescue organisations around the world.

For communications from the field, ruggedised VT-220-type terminals, installed in communications vans, are used. The vans have radio communications and communicate with headquarters via Itterra satellites mounted on the back of Ford F350 trucks.

The NSCA's computer services manager, Andrew Bennett, explained the roles of the NSCA's computers: "There are a number of roles the computers are used for on the operational side. We use them for imaging processing — particularly for mapping bushfires. We use remote sensing scanners which see through smoke and can detect underlying fires from the air.

"On the operational side they are also used for the tracking of resources — what you have available at any given time such as available aircraft and vehicles, air and ground crews, and parachute jumpers.

Fibre optics

"There is just too much information and too many people to keep track of using a manual system."

DEC has described itself as the world's greatest networking company, but a lack of expertise with optical fibres forced Bennett to stall the NSCA's plans of installing an optical fibre-based network.

"We were intending to use fibre optics, but as yet have not gone ahead with the idea. It would be nice to use fibre-optic cable eventually, because it removes the problems we have, being so close to an airfield, with noise on the lines.

"DEC came up with a plan for the installation of fibre optics, but then asked if we would be happy if a third party was involved in doing it. I decided against it at that point."

Generally, Bennett praised DEC hardware and software, but criticised the company for its expensive maintenance support and refusal to establish an office in Sale, about 3 ½ hours from Melbourne, where the NSCA is headquartered.

Bennett designed the NSCA's computerisation program when he joined the company two years ago and incorporated "quite a degree of fault tolerance and back-up for the system".

"We would not have severe difficulties if our top-end Vax went down. We can even use the Micro Vax if necessary. Fault tolerance is one of the reasons we have two or three machines."

He said the NSCA had an uninteruptable power supply based on a bank of 25KVA batteries, which would last 10 minutes if the NSCA's 65KVA diesel generator failed to cut within 20 seconds of power failure.

"The existing system will see us through the next two years, I hope. We will then add a more powerful Vax to the cluster. I think we will probably replace the Vax 780 with a Vax 8600 or something of that ilk, but who knows what computers will be around in two years time," Bennett said.

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Commonwealth chose a local PABX

WHEN the Commonwealth Bank of Australia went shopping for a third generation PABX system, which would permit it to establish an Australia-wide network incorporating all capital offices, its selection criteria was tough.

The bank wanted equipment with transparent facilities and the capacity to be easily expanded. It had to have first-rate support and after sales back-up from the supplier and, of course, the price had to be competitive.

"We had a thorough look around at what was available and NEC Australia fitted the bill," said David Longhurst, manager of voice communications system for the Commonwealth Bank.

"NEC offered an excellent system, had a good track record, was manufactured in Australia with a relatively large local content and the price was right," he said.

This multi-million dollar expansion by the bank was based on NEC Australia's Neax 2400 IMS series.

"The existing system we had was an abomination of old electro-mechanical step-by-step and cross bar equipment which offered no SPC (Stored Program Controlled) facilities. We needed a third generation system to cope with our present and future needs," Longhurst said.

The NEC system's architecture allows relatively simple and cost-effective expansion and this was a vital factor in the bank's decision to buy it.

The bank operates in Australia's highly competitive financial field.

In its Sydney and capital city offices, the bank needed PABX equipment ranging in size from 100 extensions to 2500 and beyond and the Neax 2400 series is ideal.

For smaller branches, with 30-plus extension requirements, NEC's new Neax 2400 SDS has been used and it has facilities which offer the opportunity to further extend the bank's networking.

"Our networking program at the Commonwealth Bank is an on-going project," Longhurst said.

The Neax series is the top-selling PABX in Australia and holds around 50 per cent of the market, said NEC Australia's marketing manager, Geoff Reynolds.

The Neax 2400 series accommodated not only telephones but other office automation equipment such as fax, personal computers and host computers, to build an integrated information network.

The equipment handles multi-media information such as voice, data and image and is capable of building an information network of any scale to meet the needs of the user because of its ability to interface with an analogue, digital or packet network.

Other facilities provided are direct access to voice and fax messages, plus electronic mail.

"We have been most satisfied with NEC Australia. The company has responded to specific requests to look at special problem areas and have solved a great many of them," Longhurst said.

"The major selling point of the NEC system was its expandability to meet needs and requirements as they occur," he said.

"One of the things we have done with the 2400 series is use the D'Term V handset with a 24 button addon module for our dealers' positions in smaller operations in such locations as Brisbane, Perth and Adelaide.

"The way we have utilised the 2400 system with the D'Term V handset has been relatively unique and a major benefit has been the integration of the dealers' system into the entire network. This has lead to benefits, specifically in terms of redundancy and multiple use of network facilities," Longhurst said.

The Commonwealth Bank Card Centre at Parramatta, Sydney, which serves the bank's credit card holders such as Mastercard and Bankcard, uses another piece of NEC equipment — its Automatic Call Distributor.

The system based on Neax 2400 has been installed for two years.

Car costings shown by software

SYDNEY — Ford dealers throughout Australia are using a network of Unisys PW2 workstations running finance and insurance software to show prospective vehicle buyers purchase, leasing and insurance plans.

Sixty workstations, worth more than $A400,000 have been connected with a further 40 expected by the end of the year.

Dealers are provided with communications links to Ford Australia and other services such as Viatel, via X.25 Packet Switching or dialup lines as applicable. They can also access common information stored on Ford's Unisys A-15 mainframe.

Ford Credit Australia Limited designed the finance and insurance software to enable dealers to easily formulate individual purchase plans and to provide on-the-spot calculations of the associated costs involved when buying a vehicle.

The finance software calculates loan repayments, including interest, over an allocated time period. It can readjust payment plans to cater for customers with seasonal income or changes in the payment term.

The insurance software offers tables of car insurance rates for the purchased vehicle as well as alternative repayment schedules adapted for life, disability and unemployment insurance.

Land Tax net rationalised

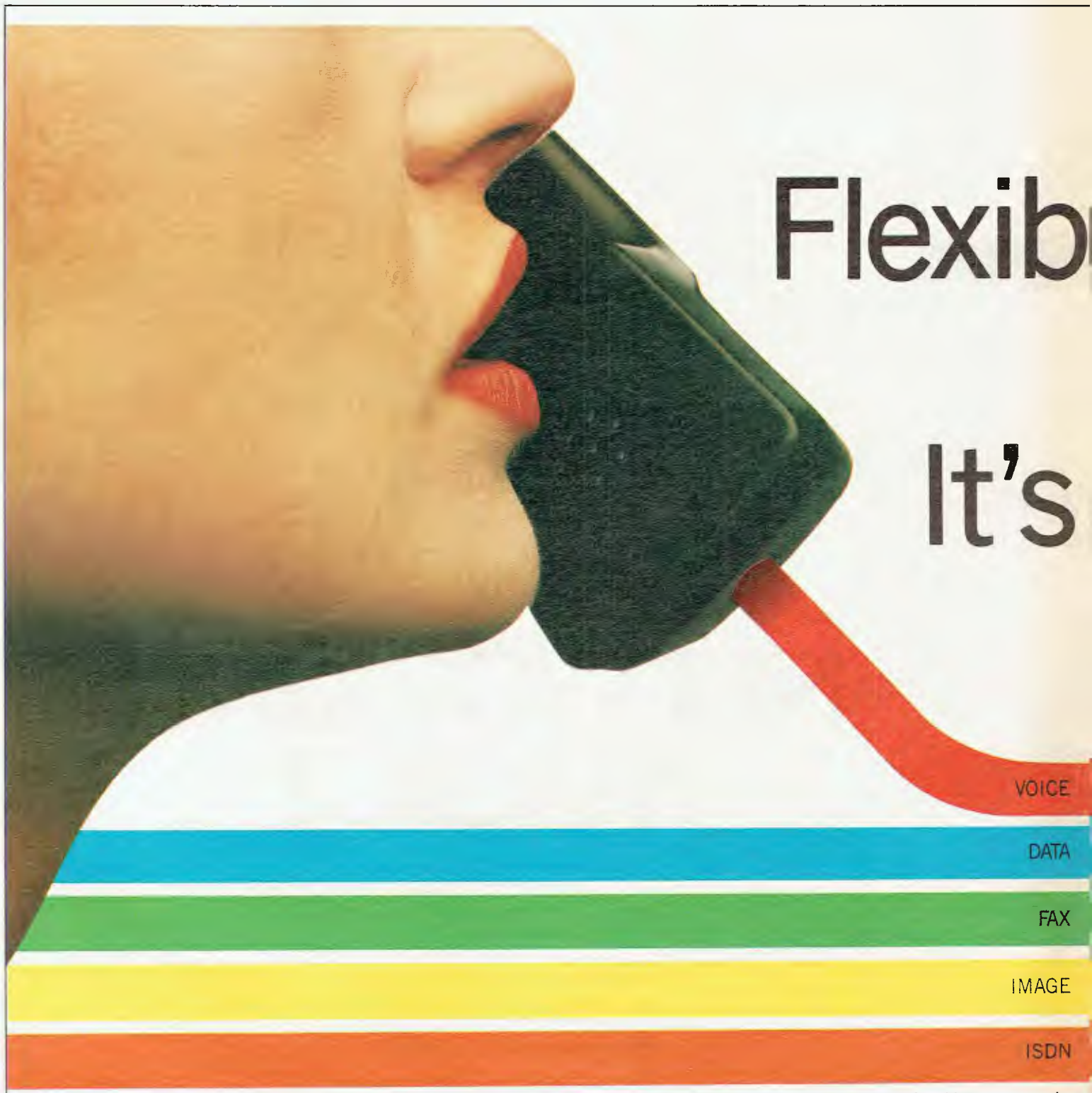
MELBOURNE — The State Taxation Office of Victoria (STO) has implemented a cost-effective rationalisation of its Land Tax Network, based on Telecom's Megaband Service and Scitec Communication Systems' multiplexers.

The STO's network manager, Geoff Adams, said the Scitec BSP multiplexers and the Telecom gear would provide "substantial cost savings after 14 months of installation".

The savings were calculated by comparing the costs associated with expanding the existing Telecom Datel services which entail a high recurrent rental.

The STO uses two BSPT1 multiplexers with 20 channels on a 2M-bit/sec link for its land tax network operations. One is onsite and the other at the Government Computing Centre, (Vicomp), which houses a Unisys A15 mainframe to which the STO is linked.

Adams said expansion of the network would be easily achieved, because the BSPs were able to be extended to 120 channels and the present configuration was using only 20 — about 10 per cent of the available bandwidth on the Megaband link.



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Inventors defend Arcnet

By DAVID BEYNON
Computerworld Associate Editor

SYDNEY — The 10-year-old Arcnet Lan technology will remain a market force for some years yet because it is one of the cheapest, most reliable and best and documented Lans around according to its inventors, the Performance Technology networking company.

Les Doss, the product marketing manager for the Performance Technology company which grew out of Datapoint's R&D group three and a half years ago, said: "There is too much money invested in the installed base for Arcnet to die.

"In the US, Novell sells better than 45 per cent of its systems on Arcnet. Citibank in New York City, for instance, has 2000 PCs running on Arcnet. The 55-60 Arcnet interface card makers in Taiwan ensure that Arcnet is the cheapest Lan on market."

The 2.5M-bit/sec Arcnet is not only the cheapest, he said, but was recently nominated as editor's choice by the US *PC Magazine* because it is faster than the 10M-bit/sec Ethernet or 4M-bit/sec Token Ring in many office automation applications.

"Most PC networks do not transfer large data blocks which is where Ethernet and Token Ring gain," Doss said. "Ethernet was really designed for the mini-systems market and not for transferring many small packets of data."

Arcnet was designed "from the ground up" to handle the small, typically less than 4K-byte PC Lan messages efficiently, Doss said.

Doss, and colleague Bill Moodie, the technical co-ordinator for Performance Technology, were in Australia recently to present user seminars on Powerlan, the company's Netbios OS/2 compatible networking system.

The Powerlan system, available from September 1, includes: non-dedicated servers, the Powerserve dedicated file server which stores its files in MS-Dos format and supports up to 32M-bytes cache memory, and the Powernet structured user registration system which automatically sets up the user's environment at logon.

The software, which was written in C to run on 286/386 based PCs, includes Netbios bridge which allows 286/386 PCs to operate as non-dedicated bridges between Lans.

Moodie said Powerlan was built after PT decided to align with IBM's SAA OS/2 product development strategies. The product has proved its compatibility by connecting transparently to OS/2 servers, he said.

Doss said: "IBM is too powerful to be ignored. The only company that has been able to do this has been DEC, and then only in the mini market. DEC is hurting right now as IBM minis are taking off in the market."

PT's commitment to OS/2 follows that shown by major hardware vendors such as Hewlett-Packard in the US and the moves of major users such as the Coca-Cola Corporation.

Bill Moodie (left) and Les Doss

The Coca-Cola Corporation has decided to purchase 386 machines only as part of a planned move to OS/2 operating system, Moodie said.

Powerlan is not "server centric" like the proprietary Novell, but will allow any PC on the network to be upgraded to act as a non-dedicated net-server, he said.

Moodie claims that since the network server function can be distributed over a number of machines on the Lan, lower classes of machines such as 286 PCs will give better performance than high-speed ATs running on Novell.

Doss said: "A Powerlan network installed in a Canadian nursing college was able to grow to 38 terminals with 11 of the PCs acting as net-servers before a dedicated file server was needed."

Tandem runs society's ATM net

PERTH — The Home Building Society of Western Australia (Home) has installed a Tandem Computers CLX 620 system to process automatic teller machine (ATM) authorisation requests from its network of more than 700 machines.

The order is Tandem's first in WA for the CLX range of distributed systems. Home, the second largest building society in the State, is connected via Austnet to the ATMs and several thousand Electronic Funds Transfer-Point of Sale (EFT-POS) terminals.

Home will use the Tandem hardware and Base24 software for Austnet ATM switch access, a continuous ATM and EFT-POS authorisation service and a realtime updating facility for customer account balances.

Home's senior corporate services manager, Terry Pye, said: "With the Tandem system we will be able to enhance the services that we offer to our customers. Customer information on our Cashcard accounts will be faster, more reliable and most importantly, accurate and up to date."

High security

A spokesman for Tandem refused to give details about the value of the deal. He said Base24 provided users with the means to accept various EFT services.

"It allows transactions originating from a broad range of devices to be accepted, authorised, switched to a host, interchanged with other financial institutions, logged and audited, all of course, with the highest degree of security."

The CLX processors are the latest addition to Tandem's comprehensive range of full function online transaction processing systems. The range is compatible with Tandem's Guardian 90 operating system and system applications software.

A single processor, single-cabinet CLX-610 can expand to a six-cabinet system (CLX660) with six processors, 600 communication lines and 10G-bytes of storage.

Each CLX system has an X.25 network, a dedicated remote diagnostic port, and two asynchronous lines as standard.

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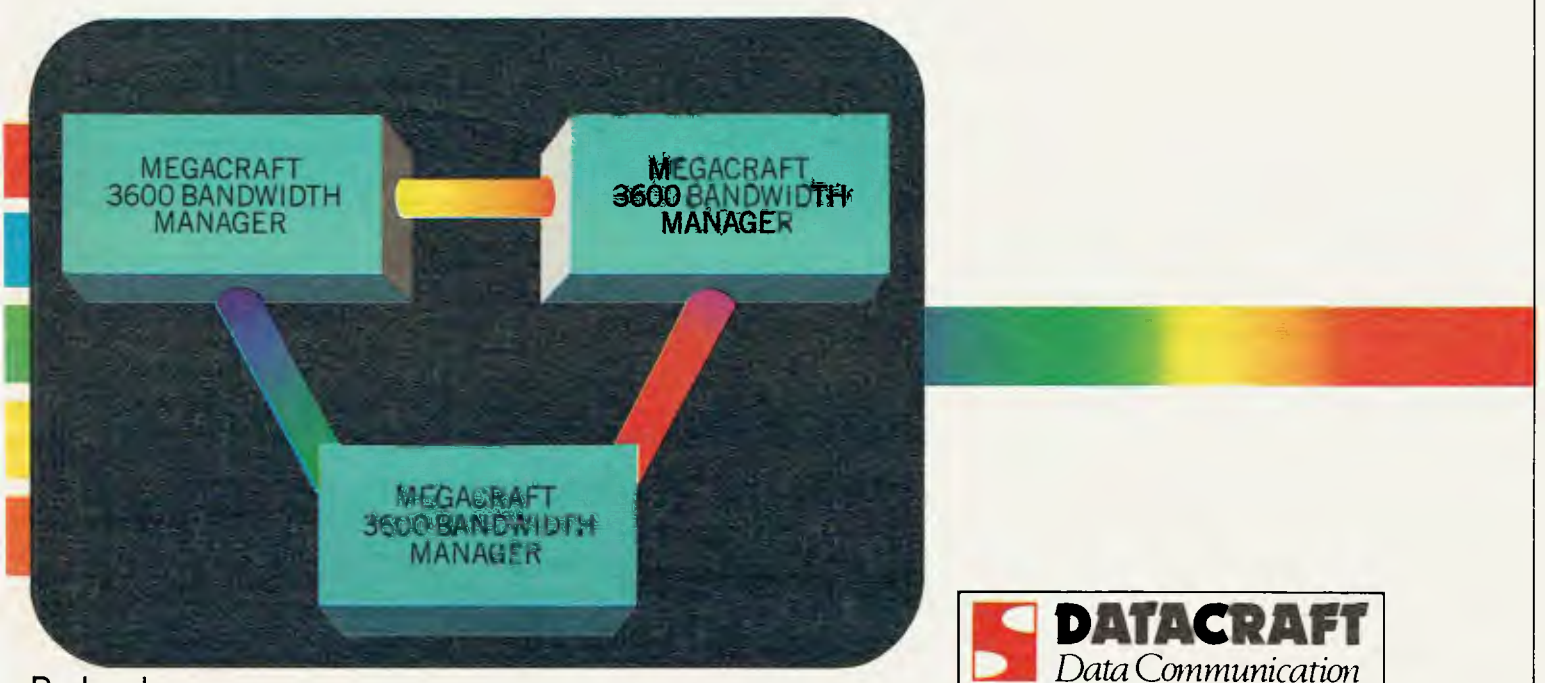

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Already Austel is a political football

AUSTEL, the embryonic independent body established by the Federal government to regulate Australia's telecommunications industry, is not due to come into being until July 1, 1989. But already it is becoming a political football.

The Minister for Transport and Communications, Senator Gareth Evans, scored points by announcing that Austel would be based in Melbourne, because one of its main functions was to watch over Telecom, which was headquartered there, like many telecommunications equipment manufacturers.

Not be outdone, the shadow minister for communications, Senator Tony Messner, slammed Austel's gestation period. He suggested it would be a lame industry watchdog if in the intervening period Telecom was able to finalise deals, such as its joint ventures with Hewlett-Packard and Fujitsu and dominate the market.

"Recent partnership deals and joint ventures between Telecom and a number of large private companies are increasing Telecom's power and dominance in the market and reducing the ability of competitors to survive," he said.

"The government's so-called deregulation of Telecom should be seen for what it is, a total sham. In the absence of any action to set up the proposed new watchdog in the telecommunications industry, Austel, before next year, the government is giving Telecom a free rein to do anything it likes to beat off competition."

Senator Messner said the government's limited deregulation of Telecom would amount to nothing if Telecom was allowed to run riot in the telecommunications and information technology industries.

"The cost of Telecom's recent buying spree, which includes the purchase of some electronic information services from Fairfax, and proposed future deals, could be as high as $A1000 million," he said.

Senator Evans said Telecom's transition from a commission to a corporation would be accelerated. He said the budget session amendment bill containing many of the telecommunications reforms outlined in May would include provisions to enable the new board to be established on January 1, 1989.

Work was also progressing in many areas of the government's reform package, including:

- Defining Telecom's Community Service Obligations to allow it to properly identify the cost of such services.
- Setting a price-cap formula to guarantee consumers real cuts in the cost of basic telecommunications services.
- Discussions between Telecom and industry in the leadup to the opening up of PABX maintenance to full competition from January 1, 1989.
- The introduction on July 18 of interim regulatory arrangements to ensure that continuing regulation by Telecom prior to the establishment of Austel would be consistent with the government's new policy.
- Preparations for implementing the industry development arrangements would further encourage the communications equipment industry to be export-oriented.

If Austel, in its pre-birth innocence, is already being kicked for political goals, let us hope its independence and designs are worthwhile and not shackled by politics.

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Lans began the PC explosion

Jeff Malley . . . by the end of the decade an estimated 80 per cent of PCs will be connected to Lans

IN THE first of a two-part series, Jeff Malley, managing director of Megabus, breaks local-area networking down and explains the evolution of a technology that has helped spur the information revolution.

A LAN is a data communications system that links computing devices within a geographical area — in one building or among several in an office complex or campus — to share information and resources. It does this at high data rates, several M-bit/sec. A typical Lan, in its early stages, supports between four and seven users in a department.

Before 1984 there were no industry-wide standards for Lans, and vendors followed their own rules. This lack of standards created many problems, the most serious being that software developers were hindered from writing network Lan applications.

Then, in 1984, IBM announced PC Network to interconnect PCs over a Lan in departments and offices. This was the beginning of the PC explosion. By the end of the decade an estimated 80 per cent of PCs will be connected to Lans.

Other vendors, such as Digital Communications Associates with 10Net, were able to improve upon these offerings with greater functionality, performance and easier installation.

Emerging Standards: To create a universal environment for network applications, there was a need for networking facilities to be included in the most common operating system, IBM/Microsoft Dos. The introduction of Dos 3.1 saw the creation of the first networking standards.

These allowed software vendors to write to a set of rules for file-sharing purposes. This permitted record-locking mechanisms for data files.

Second there was Netbios, a communication interface developed to provide compatibility between network services.

Dos 3.1 saw the introduction of the file server concept. A file server is software running on a dedicated PC which provides file access requests from several PCs on a Lan. It is also a central point for control of shared peripherals such as disks and printers.

Subsequent evolutions of Dos have improved this situation further. The latest version Dos 3.3 allows vendors such as 10Net to include software disk-caching capabilities. Caching offers much faster disk access and improved network performance in areas such as database applications. It also provides better diagnostic tools such as Remstat, a networking management tool that permits diagnosing of network resource usage.

Some Lans, such as 10Net, do not require a dedicated PC to act as file server. Instead the file server is allocated to the least-used PC. The status of this PC can be altered at any time as usage dictates and the file server functions can be allocated to another PC.

Netbios (Network Basic Input Output System), since its introduction by IBM, has been the de facto standard for a session-level interface (level 5) to network applications.

Netbios is a ''peer-to-peer'' standard application-programming interface, so there is no concept of a ''host'' computer. It therefore allows programs using this interface to co-operate.

It is vital to understand that Netbios is an interface and not a protocol and is therefore independent of the underlying Lan protocols.

A session is a logical, two-way, point-to-point connection between two applications. It provides the ability for data transfer for a period of time.

Netbios allows the establishment of a session between two named entities, known as resources, on the network. A resource on the network can be workstations, hard disk drives, floppy disk drives, printers, backup tape units or communication lines.

Applications can exchange information via Netbios through sessions or datagrams. A session allows two resources to exchange data reliably by sending and receiving messages. A datagram is an unreliable transfer of data from one resource to another, or to a group of resources on the network.

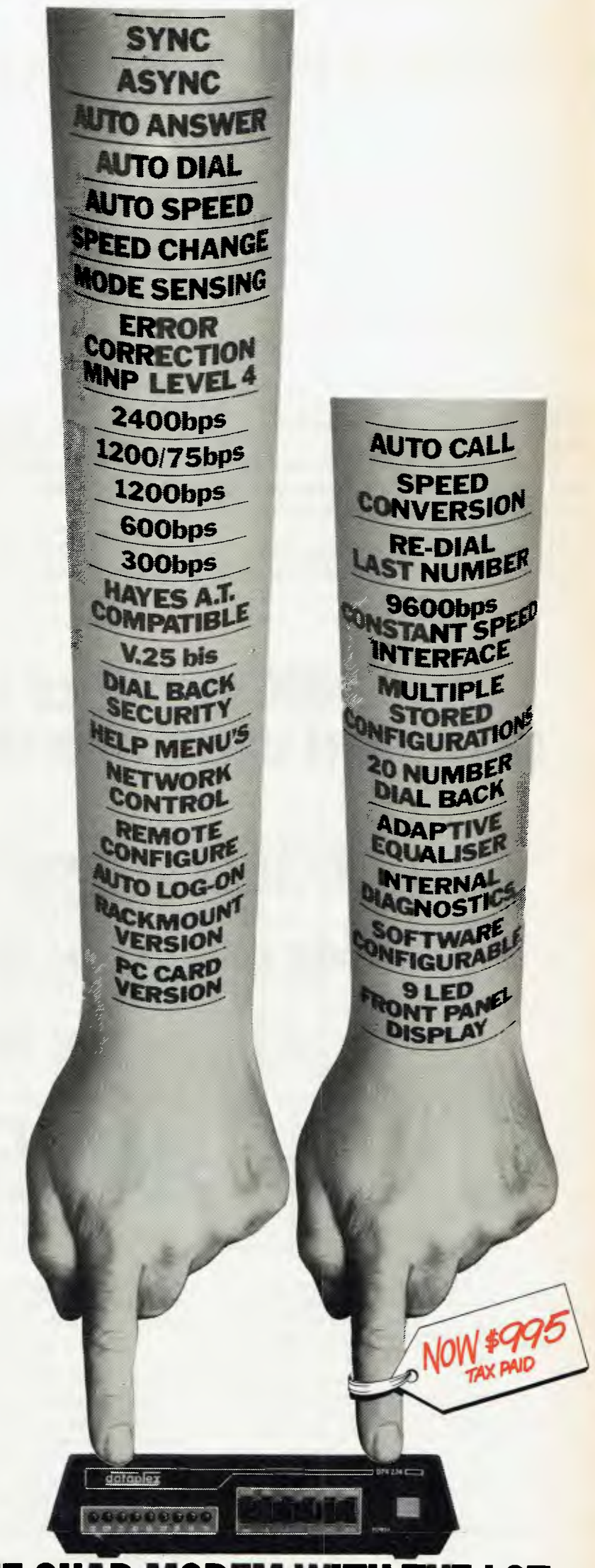
Cabling a Lan: Network cabling is simply the cable used to connect network interface boards from PC to PC. There are three main methods of making this connection: twisted pair, coax and optical fibre.

Twisted pair generally comes with a single or double pair of wires protected by an outer layer of insulation. Twisted pair is either shielded or unshielded. Shielded twisted pair is used in areas prone to electrical interference — in most office environments no shielding is necessary.

Twisted pair cabling is simple and inexpensive to instal and offers greater flexibility in network expansion, with minimum disruption. This form of cabling is used in telephone networks and exists in most buildings. Many Lans, including 10Net, use this cabling.

Coax cable is a single strand of wire, called

(Continued page 10)



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Lans began the great PC explosion

(Continued from page 9)

the conductor, surrounded by stranded wire that acts as a ground. They are kept apart by insulation and the entire cable is protected by an insulation jacket.

Coax cable is available in a variety of thicknesses — the thicker the cable the greater the distance the signal can be transmitted.

Fibre optic cabling transmits a light signal through a hollow glass tube. It offers a high resistance to outside interference and allows transmitting at high data rates over long distances — up to 6kms. It is, however, more costly than twisted pair or coax, and less flexible in installation.

Topologies: The topology is the method used in linking PCs by one of the above types of cabling. There are three topologies: the bus, the star and the ring.

The bus topology is the most widely used. It can be described as a straight trunk line with taps for PCs to branch off. It calls for a terminator at each end of the trunk to truncate the signals transmitted.

Bus topology represents the easiest form of cabling and offers the greatest flexibility for extensions. When adding PCs to the network, on most Lans it is necessary to stop all traffic on the trunk and on all PCs to tap into the line.

One of the unique features of 10Net is that it allows PCs to be added to the bus without closing the network. Each participating user needs to establish its own connectivity with each additional node. In this way work need never stop.

In the star topology, the file server is located centrally and a cable extends from it to each remote PC. This topology, although used with PCs, is more widely accepted with minicomputers.

With this star topology, all resources are maintained by the central file server. This offers the disadvantage that if these resources fail, then the whole network is inoperative.

Conversely, this topology does allow extra PCs to be added with very little effect on the rest of the network. However, expansion is limited by the capabilities of the file server and its operating system.

The ring topology can be described as a bus topology that loops back to the starting PC. It has not proven as successful in its acceptance for cabling configurations. Once again, the entire network needs to be down for expansion to occur.

Network interface board: In the section on cabling, we discussed the network interface board being linked from PC to PC. This printed circuit board is fundamental to the operation of a Lan. It fits into an expansion slot of each PC and ties the PCs together.

Network interface boards come in a variety of shapes and sizes; some have on-board processors, others have Ram and all have custom-designed chips. All need powerful software to drive them.

Network software: This performs two tasks: to allow the network interface boards to communicate over the network cabling system, and to provide the intelligence for PCs to hard disks, printers, plotters and other peripherals.

In recent years the trend in Lan vendors has been towards those that offer the most powerful network software. The hardware components — network interface boards and cabling methods — have become secondary issues.

The first principle of network software is the way in which it interacts with Dos. In some cases the network software replaces Dos, while in others it acts as a shell for Dos.

In early versions of Dos, it could not support multi-user applications, and so some Lan vendors tried to develop an operating system that would replace Dos. But as explained, this situation changed with the release of version 3.1

In the early evolution of Dos, other vendors, such as 10Net, had stayed with the operating system and had developed shells in which Dos could operate.

This type of structure placed them in a better position to react to changes in the field of PCs, such as 80186/286/386 processors and Dos 3.1

When evaluating Lans prior to purchase, considerations such as the stability of Lan vendors who have moved away from Dos, and your comfort with other operating systems, are of critical importance.

> *"Data protection by way of passwords provided"*

The operation of the Lan depends upon the network server software which allows the PCs to share hard disks, printers, plotters and other devices. In some instances — in 10Net for example — it also provides the means for PCs to communicate with each other via e-mail. It provides data protection by way of passwords as well as network management systems such as resource maintenance, file recovery and print spooling.

Dedicated file server versus non-dedicated: In the early days of Lans it was known that the odds in favor of having a dedicated file server were high because of the Ram requirements of some Lan vendors' software. This left little or no memory to execute application software.

More recent software developments have provided the same operating power with less code, hence less memory usage. This has allowed the use of non-dedicated file servers.

There are pros and cons on both sides. When initiating a Lan it is worth bearing in mind the following points.

A dedicated file server:

- Will lose day-to-day keyboard capabilities of the dedicated PC.
- Can help provide better physical security.
- In larger networks, multiple dedicated file servers are needed due to increased workload.
- Network software can fully use memory, therefore providing better performance capabilities.
- Additional hardware costs.

A non-dedicated file server:

- Does not require additional cost to replace a PC.
- Increased potential of PC operator affecting other network users.
- Generally lower capabilities of serving same number of users versus dedicated file server.
- Significantly reduces initial installation costs.

● *Jeff Malley will continue this article in the next issue of* Network.

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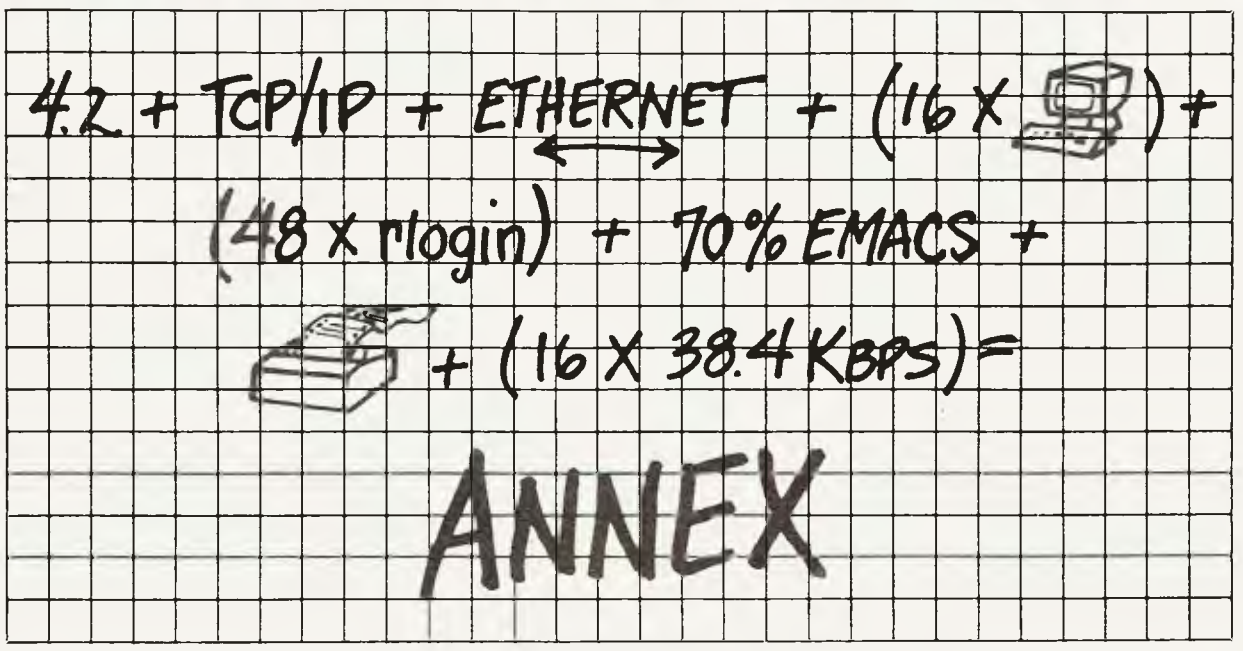

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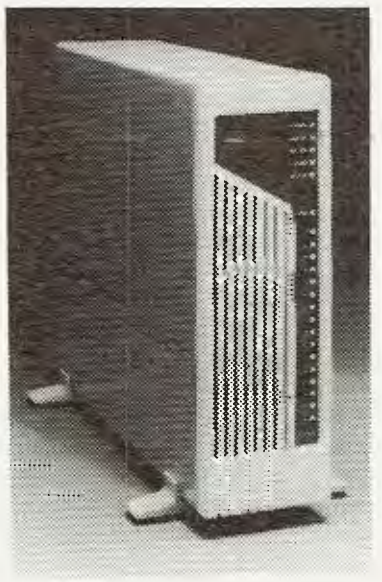

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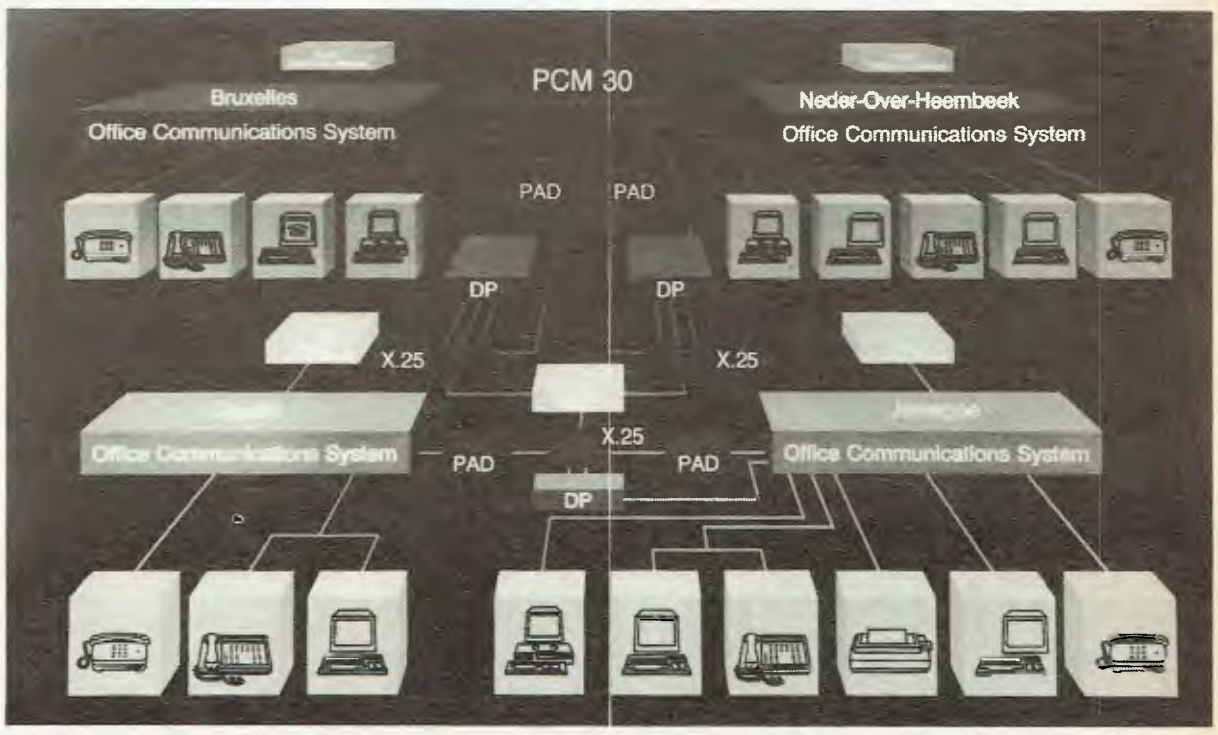
The PABX comes into its own for data traffic

By BEN BRAEUER



Siemens' Telecommunications system at Solvay, a large chemicals company in Brussels

DIGITAL PABX systems have been with us now for more than half a decade, and yet data and communications managers have been traditionally reluctant to entrust any more than small amounts of data traffic to a company's PABX system.

However, a growing number of major international companies are finding that using the PABX system as a joint voice data medium provides a newfound degree of flexibility as well as an impressive array of data features.

Siemens System 601 was chosen as the vital link in providing the foundations for a secure communications future for Solvay, the giant Belgian chemical and pharmaceutical company. The executive responsible for telecommunications co-ordination at Solvay, said: ''Our ideas took shape gradually, but Siemens has been extremely flexible and adaptable in its response. We had to link up computers, terminal equipment and peripheral devices from different manufacturers. The deciding factor was Siemens' experience in this field.''

Solvay is based in Brussels, with an R&D staff of 2800, and the company works via subsidiaries in 32 countries. Fast, smooth-flowing voice and data communications is a vital element in allowing this multinational company to retain its competitive edge in a cut-throat market.

What Solvay's researchers wanted was simple, straightforward access to external databases and remote PCs both nationally and internationally. Access via the Belgian DCS (X.25 packet-switching network) as well as data security were also major requirements.

Used as server

With System 601, Solvay can use its HP 3000 computer as a server for electronic mailbox services. This application covers all Solvay's Belgian branches. No matter where they work, users of this service can receive, send and process their mail electronically.

The connection of mainframes to System 601 allows computers to be used as servers. At Solvay, this gives researchers access to Digital Equipment-type Vax/8600 and Vax/760 equipment from their own workstations for performing scientific calculations. As a result of networking, the installed DEC Microvax computers can be used as a central text-processing server and for calculating or simulating chemical fermentation processes.

The executive said: ''The ISDN will soon be here, and that is going to have a decisive impact on both private and public sector communication. But the Siemens System 601 is already allowing us to meet specific objectives in our plans to improve the efficiency of our voice and data communications and signifies an initial step into the future.''

In Australia also, key organisations are entrusting their data communications to the PABX.

The National Safety Council based in Sale, Victoria, deals with the various emergency services on a continuous basis. Here, communications efficiency and reliability are clearly a key issue. Out of 300 System 601 PABX extensions, one third are digital, providing direct terminal connection to the council's DEC Vax 11/70 and Honeywell DPS6 data systems.

Worldwide, Siemens has sold more than 1.5 million lines of digital PABX equipment. Its System 601 Digital PABX is distributed by Telecom Australia.

● *Ben Braeuer works for Siemens Ltd.*

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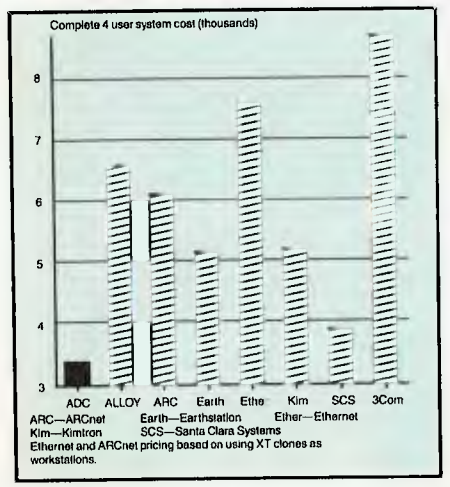
AUSTRAL STANDARD CABLES

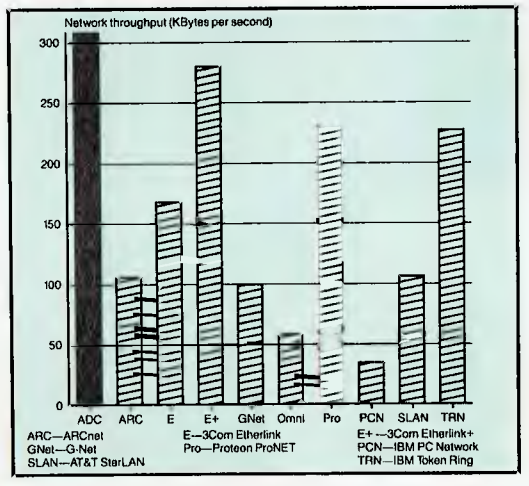
Moorebank Avenue
LIVERPOOL NSW 2170

A Member of the Metal Manufactures Group of Companies

TWO WORDS OUR NETWORK COMPETITORS SEEM TO HAVE OVERLOOKED:

PRICE. PERFORMANCE.





These graphs tell you everything you need to know about networking price/performance. LAN's can be expensive, slow, and complicated. Time sharing is even slower and less capable. Security is non-existent. But now it's easy to see there's a better choice with ADC's comprehensive new solution for multi-user systems: **The Personal Network Station™**—selected Product of the Year in the multi-user PC category by LAN Magazine (Feb. '88).

Performance test results are from an independent LAN Evaluation Report from Novell,™ and were based on Novell's PERFORM™ program. Results were obtained using an 8 MHz IBM AT® file server with six 6 MHz IBM AT workstations. Six Personal Network Stations were used for the ADC test. If the tests had been conducted on PC workstations, the other networks would have tested as much as 70% slower. All prices are based on manufacturers' suggested retail prices and are subject to change.

ADC's Model 2 MG Expansion Board

Top performance through "clustered CPUs."

The Personal Network Station gives each user outstanding speed, storage capacity and data sharing benefits at approximately half the cost of networking PC's in a LAN. Each Personal Network Station has its own CPU and memory, but unlike most other networks, the CPUs are "clustered" on the file server bus. Since access to the file server does not depend on time-consuming network protocols, network throughput does not deteriorate as stations are added to the network. And with one central PC, it's easy to control security for disk and tape files.

Fast, direct access with the ADC Model 2 MG expansion boards.

Personal Network Stations are not clones or diskless workstations. ADC uses a Model 2 MG Expansion Board that plugs directly into the PC, with each board containing all the electronics needed for two PC-compatible Personal Network Stations. The board provides each user with a dedicated CPU and 512K of RAM. Data transfer is not limited by a network cable, so speed and performance remain at peak. Personal Network Stations are easily and quickly installed on-site. Just plug in a board, add low cost monitors and keyboards for each user, and the PC becomes a multi-user system. By adding additional boards, you can build a system supporting up to 32 Personal Network Stations from a single IBM PC,® XT,® AT,® PS/2,® or compatibles.

Total PC-network compatibility including Novell Netware.

With Personal Network Stations, each user can work independently of any other user in a standard DOS environment. So there's no need to learn new operating rules. The addition of networking software offers the option of LAN interface with software choices, including the industry standard IBM PC-Network by using Network-OS,® or the fast and sophisticated NOVELL Advanced NetWare.™

THE PERSONAL NETWORK STATION

NOW WITH COLOUR!!

Every user gets 10MHz processor and 768 Kb.

Sole Australian Distributor
AUSTRALIAN NETWORK CONNECTION
15 Boundary St
Rushcutters Bay NSW 2011
Tel: (02) 360 2822
Fax: (02) 331 2115
Call now for prices and specifications, full performance reports.

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